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Planning for Sustainable Salmon in Southeast Alaska, and Prioritization of Projects for the Southeast Sustainable Salmon Fund

by

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and

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September 2002

Alaska Department of Fish and Game **Division of Sport Fish**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used in Division of Sport Fish Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications without definition.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
metric ton	mt
milliliter	ml
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.
All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.
and	&
at	@
Compass directions:	
east	E
north	N
south	S
west	W
Copyright	©
Corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
et alii (and other people)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.,
id est (that is)	i.e.,
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
number (before a number)	# (e.g., #10)
pounds (after a number)	# (e.g., 10#)
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)

Mathematics, statistics, fisheries

alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	F, t, χ^2, etc.
confidence interval	C.I.
correlation coefficient	R (multiple)
correlation coefficient	r (simple)
covariance	cov
degree (angular or temperature)	°
degrees of freedom	df
divided by	÷ or / (in equations)
equals	=
expected value	E
fork length	FL
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
mideye-to-fork	MEF
minute (angular)	'
multiplied by	x
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
standard length	SL
total length	TL
variance	Var

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PLANNING FOR SUSTAINABLE SALMON IN SOUTHEAST ALASKA, AND PRIORITIZATION OF PROJECTS FOR THE SOUTHEAST SUSTAINABLE SALMON FUND 2001

by

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The Special Publications series was established in 1991 for the publication of techniques and procedures manuals, informational pamphlets, special subject reports to decision-making bodies, symposia and workshop proceedings, application software documentation, in-house lectures, and other documents that do not fit in another publication series of the Division of Sport Fish. Special Publications are intended for fishery and other technical professionals. Special Publications are available through the Alaska State Library and on the Internet: http://www.sf.adfg.state.ak.us/statewide/divreports/html/intersearch.cfm This publication has undergone editorial and peer review.

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PREFACE

In response to guidelines established in the state's Sustainable Salmon Fisheries Policy and to meet provisions in the Southeast Sustainable Salmon Fund (SSSF) a meeting was held on January 3-5, 2001 with key staff from the Commercial Fisheries, Sport Fisheries and Habitat and Restoration divisions, Alaska Department of Fish and Game (ADF&G) to initiate development of a sustainable salmon plan. The mission of the plan is:

> To sustain a healthy and biologically diverse wild salmon ecosystem in southeast Alaska and the human use of wild salmon in that ecosystem, through salmon research, monitoring, restoration and stewardship.

The intent of the plan is to ensure that funds made available through various sources, but especially the SSSF, are directed towards meeting priority information needs and issues.

This plan establishes a framework for developing and evaluating goals and objectives, and a process for determining the most important priorities. Goals are long-term achievements that contribute to accomplishing of the mission. In the plan goals incorporate principles of the Sustainable Salmon Fisheries Policy. Measurable statements of purpose are articulated as objectives. The difficulties, uncertainties or information needed to achieve each objective are indicated, and options are identified as projects. The plan structure accommodates currently-funded and proposed projects.

The focus of the initial meeting held January 3-5 was primarily to develop a plan and use that plan to evaluate projects proposed for SSSF consideration. Beyond developing and weighting goals, objectives and issues, optimization approaches (incorporating project priority scores and costs) were used to assist in selecting a project set likely to contribute the most towards meeting goals of the plan within funding constraints.

The following outlines the steps taken to develop the sustainable salmon plan and identify projects to be funded. Additionally, the benefits of the planning process are discussed along with suggested improvements for future planning sessions.

INTRODUCTION

In southeast Alaska salmon and their habitat are widespread, abundant, and generally in good condition. Although harvests and escapements of most stocks are at or near record levels, some stocks are at less than desired levels and some habitat haltered by human activities has a reduced ability to support salmon. The ADF&G has the statutory responsibility in Alaska to manage salmon for sustained yield. The challenge for ADF&G is to sustain healthy and biologically diverse wild salmon ecosystems in southeast Alaska and sustain human use of wild salmon, on which the social, cultural, and economic fabric of the region is based.

In 1999 the U.S. Congress, recognizing the need to assist states with Pacific coastal salmon recovery, appropriated funds (the SSSF) to states and tribes in the Pacific Northwest, including Alaska[1]. Alaska's portion the first year was approximately $14 million. The State decided to allocate $6.5 million to address salmon and salmon habitat research, monitoring, stewardship and restoration in southeast Alaska. Further, the State elected to fund up to $5 million for projects to "increase economic opportunities for southeast Alaska salmon fishermen" and up to $2.5 million for cooperative projects with entities outside Alaska (primarily Canada and Columbia River tribes). ADF&G, the Stakeholder Advisory Panel and the public recommended projects for funding. To ensure careful thought in expending these funds, the ADF&G employed a planning process to promote the long-term health of southeast Alaska's salmon stocks and their habitat.

The process was comprised of three prominent forms of planning: systematic, formal and incremental. Systematic planning is a systems approach that uses deductive and inductive logic to define and structure a complex problem, and derive the interactions of its parts using expert judgment (previous relevant experience, supported by rational thought and knowledge). An example of a systems approach is the analytic hierarchy process (AHP; Saaty 1999). The AHP has been used extensively for planning, conflict resolution, and prioritization in such areas as policy development, economics, engineering and military science for decades[2], and has recently been applied to fisheries research and management (NEFC 1990; Merritt and Criddle 1993, Merritt 2000, 2001a, 2001b). The AHP is a tool for facilitating decision-making by structuring the problem into levels comprising a hierarchy. Breaking a complex problem into levels permits decision makers to focus on smaller sets of decisions, improving their ability to make accurate

[1] For more information see the Progress Report on Pacific Coastal Salmon Recovery Program at www.state.ak.us/local/akpages/FISH.GAME

[2] See www.expertchoice.com

judgments. Structuring also allows decision makers to think through a problem in a systematic and thorough manner. The AHP encourages people to explicitly state their judgments of preference or importance. Options in the form of projects or actions are ranked according to weights of preference or importance assigned to the goals, objectives and issues that the option addresses. A facilitator assisted key personnel with ADF&G in using the AHP to develop a plan for salmon research, monitoring, restoration and stewardship in southeast Alaska and rank projects.

Formal planning uses quantitative models and seeks solutions to problems that are conceived in an objective state. The foundations of this method are found in classic operations research techniques (see Hillier and Lieberman 1990), and include such examples as forecasting models and optimization routines. Optimization was used to further refine the ranking of projects achieved through the use of AHP by determining the optimal allocation of SSSF funds to the overall mission of sustaining a healthy and biologically diverse wild salmon ecosystem in southeast Alaska. Incremental planning (see Lindblom and Woodhouse 1993) seeks a reasonable improvement on the status quo and is the most prevalent form of planning used by government. Political bargaining, compromise and building coalitions are used to reach agreements. A few projects were selected through bargaining and compromise.

EXISTING MANAGEMENT STRATEGY

Alaska's salmon management program is built on the principles of conservative management, sound science, and habitat protection. Alaska's habitat conservation laws and regulations provide clean, free-flowing waterways vital to abundant, sustainable salmon production. Alaska's emphasis on in-season, abundance-based management is a key to successful sustainable salmon production.

Fisheries Management

The ADF&G manages over 15,000 salmon spawning streams and rivers, and many diverse salmon fisheries throughout the state to ensure sustainability. Fisheries management includes setting escapement goals, meeting gear group allocations as set out by the Alaska Board of Fisheries, considering hatchery needs while giving a priority to wild stock, providing recommendations to the Alaska Board of Fisheries in their development of fisheries regulations and closures as needed to ensure sustainability of salmon, and assisting the Alaska Department of Public Safety in enforcement of the fisheries regulations.

In southeast Alaska, commercial, subsistence, and personal use fisheries are managed by the Division of Commercial Fisheries Management and Development. Recreational fisheries are managed by the Division of Sport Fish. Area management biologists and their support staff, stationed in the principal ports of landing, Ketchikan, Petersburg, Sitka, Juneau, Wrangell, Haines, Klawock, and Yakutat, closely monitor returns and escapements and open fisheries for specific areas and times by "emergency order." ADF&G's management of fisheries is intended to take advantage of the surplus production potential inherent in salmon stocks by managing for escapements that fall within optimal ranges well above the minimum number needed to sustain the stock. Management's primary goals are to achieve the distribution and abundance of spawners needed to (1) sustain, if not maximize, production, and (2) provide for traditional subsistence harvests. Secondary objectives are to facilitate an orderly harvest of salmon of the highest quality and value in commercial fisheries and of the greatest benefit to recreational and personal use fishers, consistent with user group allocations established by the Alaska Board of Fisheries. Transboundary and boundary area fisheries are managed to comply with terms of the Pacific Salmon Treaty, as is the region wide harvest of chinook salmon.

Habitat and Restoration Division

Protecting and restoring anadromous fish habitat is the overall management objective for salmon. The Habitat and Restoration Division of ADF&G protects anadromous fish habitat by issuing Fish Habitat and Special Area permits under Alaska Title 16 for activities affecting fish-bearing waters. The division also recommends permit conditions for authorizations issued by other state and federal agencies, including: Alaska Coastal Management Program, Alaska Forest Resources and Practices Act, National Forest Management Act, Tongass Timber Reform Act, Federal Power Act, Federal Clean Water Act, Alaska Water Quality Standards, Alaska Water Use Act, and Alaska Land Act (Title 38). The division also collaborates with landowners and managers to develop land use plans that conserve salmon habitat. When funding allows, the division monitors development projects to insure compliance with permit conditions and the effectiveness of the permit in protecting or restoring salmon habitat.

The current habitat management program primarily reviews proposed developments related to in stream activities, timber harvest, mining, community and urban expansion, transportation infrastructure, hydroelectric, water withdrawal and export, and commercial recreation and tourism. The division also collaborates with state and federal agencies in land use planning to a

limited extent. To review proposed development projects and land use plans, the division analyzes biological, engineering, hydrological and other technical information about fish abundance, habitat condition, the location and value of fisheries, and potential environmental effects of land and water developments. The division also recommends methods to mitigate adverse effects of proposed development activities and to restore past fish habitat damage or fish passage problems.

METHODS

THE ANALYTIC HIERARCHY PROCESS

A total of eleven research and management supervisory staff and Regional Supervisors from three divisions (Commercial Fisheries, Sport Fish, and Habitat and Restoration) participated in facilitated discussions regarding five species of salmon in southeast Alaska. To develop the plan, a modification of the Nominal Group Technique (Delbecq et al. 1975) was used in eliciting goals, objectives and issues, and brainstorming (Osborn 1963) was encouraged in identifying projects to address the issues.

The AHP was applied using four progressive steps: (1) structuring of the goals, objectives, issues and proposed projects as a hierarchy which formed the framework of the plan; (2) establishing weights of importance for elements of the hierarchy; (3) developing and applying criteria to proposed projects for rating; and (4) synthesis. The software program Expert Choice[3] was used interactively to structure the plan, depict the influence of weights, and derive the priority of elements. Methods for the four steps are described below.

Structuring

A top-down structuring approach was used, where goals derived from discussions of the state's Sustainable Salmon Fisheries Policy form the top of the hierarchy. Agency staff identified several objectives for each goal. For each objective the participants identified one or more issues to be addressed by specific projects. The proposed projects form the base of the hierarchy.

Establishing Plan Priorities

The group assigned numerical weights of importance to elements of the plan based on technical expertise and expert judgment. Importance was judged according to how critical the goal,

[3] Forman, E., T. Saaty, M. Selly, and R. Waldron. Expert Choice, Decision Support Software, McLean VA. 1983.

objective, or issue was to achieving the mission. The entire group met to discuss the weights of importance for each goal. Two break-out groups, determined by areas of authority and expertise, weighted the objectives and issues for specific goals. The two groups reconvened to present the results of their work to the others.

A positive ratio scale with associated verbal equivalents was used to measure importance, where numbers between those listed (e.g., 2, 4, 6, 8 or 2.5, 3.5, etc.) were used to interpolate meanings as a compromise:

Scale of Importance	Definition
9	Extreme importance
7	Very strong importance
5	Strong importance
3	Moderate importance
1	Of little importance

Elements judged to be of equal importance were given equal scores. Consensus within a range of two points on the rating of goals, objectives, and issues was negotiated and usually achieved among participants. When disparity in judging weights of importance occurred, it meant there was disagreement, and debate was encouraged. Debates advanced the understanding of important concepts and often resulted in a clearer definition of the goal, objective or issue. By seeking consensus not only was dialogue encouraged, but also the formation of a group solution, rather than individual solutions was promoted. After completing sets of judgments, Expert Choice generated bar graphs and displayed them on a projector screen so that participants could instantly see the results of their judgments.

The Ratings Model Applied to Projects

To determine the priority projects among several that addressed a single issue, a simple filter was created consisting of seven criteria:

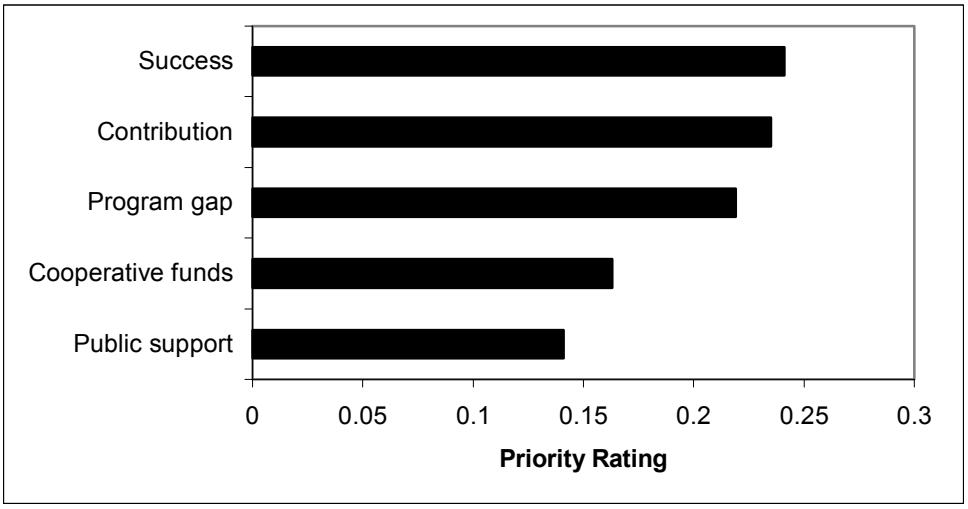
1. applicability of the project to the SSSF;
2. availability of long term funding for long term projects;
3. likelihood of success of the project;
4. stakeholder support for the project;

5. significance of the project's contribution to salmon conservation;
6. ability of the project fill a gap in the existing salmon program; and,
7. ability of the project to be cooperatively funded.

These criteria were based in part on recommendations offered through the Stakeholder Advisory Panel of the SSSF. These criteria were given broad values, and assigned ratings as follows:

Criterion	Values	Ratings
Applicability of the project to the SSSF	Yes No	Proceed STOP
Is long term funding available for long term projects?	Yes or N/A No	Proceed STOP
Likelihood of success	High Moderate Low	9 3 0.33
Stakeholder support	Yes Not much	8 3
Significant contribution of the project to salmon conservation	High Low	9 .11
Project fills a gap in the overall program	A lot Not much	9 .11
Cooperatively funded projects, where 100% means FG pays for it all.	25% 50% 75% 100%	9 6 3 1

If the project was scored as a "no" to either of the first two criteria – applicability to the SSSF or availability of long term funding for a long term project – then the project was not rated further and was dropped from the list of projects being considered. The five remaining criteria were weighted as to their importance as follows:



Synthesis

Individual project scores from the filter were then inserted at the project level into the hierarchical model, and the total model was synthesized. Thus, the ranking of projects results from:

1) the weights of importance of the goals, objectives and issues which they address;
2) their ability to address multiple issues; and,
3) the rating score derived through the filter.

The total score for each project is calculated by adding the weighted proportions over all issues for each project:

$$T_m = \sum_{k=1}^{d} W_k p_{k,m}$$

where

T_m = the total weighted score for project *m,*
W_k = the weight for issue *k*,
$p_{k,m}$ = the weighted proportion of the total score for project *m* addressing *k*, and
d = the number of projects.

OPTIMIZATION

Optimization is the process of finding the combination of projects that maximizes the total benefits without exceeding a given budget. The optimal solution offers a quantitative tool that

can be very effective in assisting with project selection. Often decision makers rely solely on the much more subjective method of trial and error to determine priorities.

To determine the optimum allocation of the SSSF monies to the overall mission of sustaining a healthy and biologically diverse wild salmon ecosystem in southeast Alaska and the human use of wild salmon in that ecosystem, through research, monitoring, restoration and stewardship, we needed to find the combination of projects that yielded the maximum contribution, subject to budgetary constraints. The optimization program weighs the cost of the project to the overall priority of the project from the AHP model within a specified amount of funding. A zero-one integer programming model (after NEFC 1990) was developed to maximize the relative benefits, represented by priority scores derived from the AHP process. An Excel spreadsheet using the Solver function was used to perform the optimization. The linear program seeks to:

maximize $P_1X_1 + P_2X_2 + P_3X_3 + \ldots P_nX_n$

subject to the constraints of $X_1C_1 + X_2C_2 + X_3C_3 + \ldots X_nC_n \leq B$

where

$X_j = 1$ if the project is selected and 0 if the project is not selected and ($j = 1,2,3,\ldots n$);

P_j = priority of project j from the AHP model;

C_j = the cost of project j; and,

B = the total budget available for funding of the projects.

In order to be able to consider and implement high priority projects of the Stakeholder Advisory Panel and the public that would be determined at a later date, ADF&G decided to conduct the optimization procedure with only $4 million of the $6.5 million available to address salmon and salmon habitat research, monitoring, stewardship and restoration in southeast Alaska. This decision resulted in $2.5 million not being involved in the optimization.

The optimization assumed that either a project is totally funded or not at all. In doing so, it compared the benefits of one-year projects with multi-year projects. This comparison was considered appropriate because the ultimate goal is to maximize the total benefits of the projects – whether that benefit is achieved in one year or several is not relevant to the optimization. The *cost* of conducting a longer-term project *is* relevant to the optimization. Total project cost estimates were provided by staff for the optimization procedure.

RESULTS

THE PLAN

Framework

The hierarchical plan consists of 70 elements: four goals, 14 objectives and 52 issues (Figure 1). When projects were added to the plan's framework it became clear that for each issue there could be several projects that address specific aspects of the issue. Furthermore, one project could address aspects of several different issues stemming from various objectives. Appendix A contains the proposed projects forming the base of the hierarchy.

It is interesting to note here that the divisions approached the planning process differently. The Habitat and Restoration Division tended to lump their projects under broader headings with no geographic or species distinctions. This resulted in a total of ten projects being proposed to meet the issues identified under the goal: "Maintain and restore freshwater, estuarine and marine habitats at levels of high potential productivity". Thus, for this goal almost every project assisted in meeting several identified issues. Alternatively, the Commercial and Sport Fish divisions identified their projects by geographic area (stream) and species of salmon. These different approaches resulted in the goal, "Maintain and restore wild salmon stocks at levels of high potential productivity", generating substantially more projects (42). Additionally, more issues were identified for this goal than the other three goals combined; 64% of the total model's issues and projects are located under this goal (see Appendix A).

Figure 1.–Plan for salmon research, monitoring, restoration and stewardship in southeast Alaska, 2001, including relative weights of importance.

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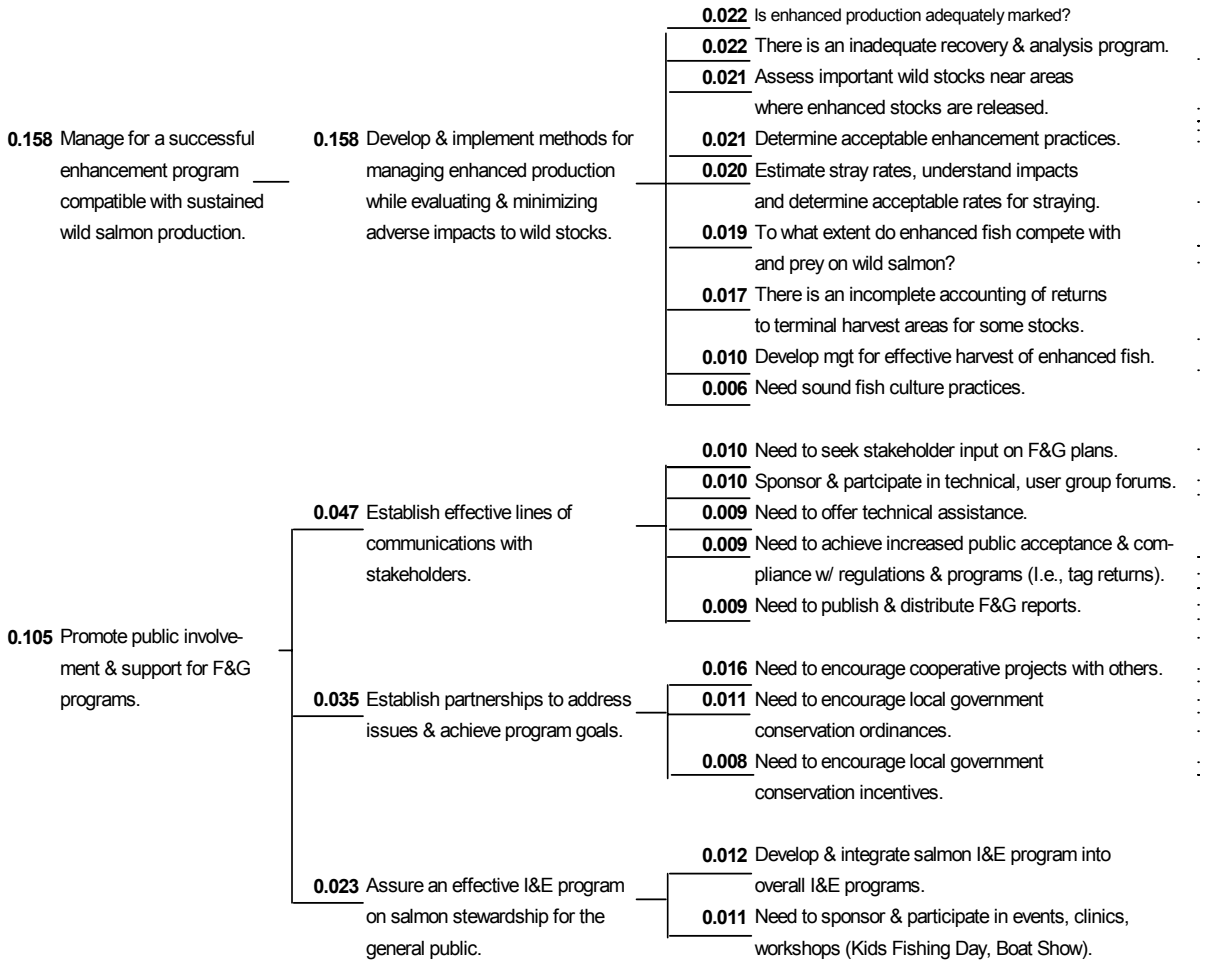
Figure 1.–Page 2 of 2.



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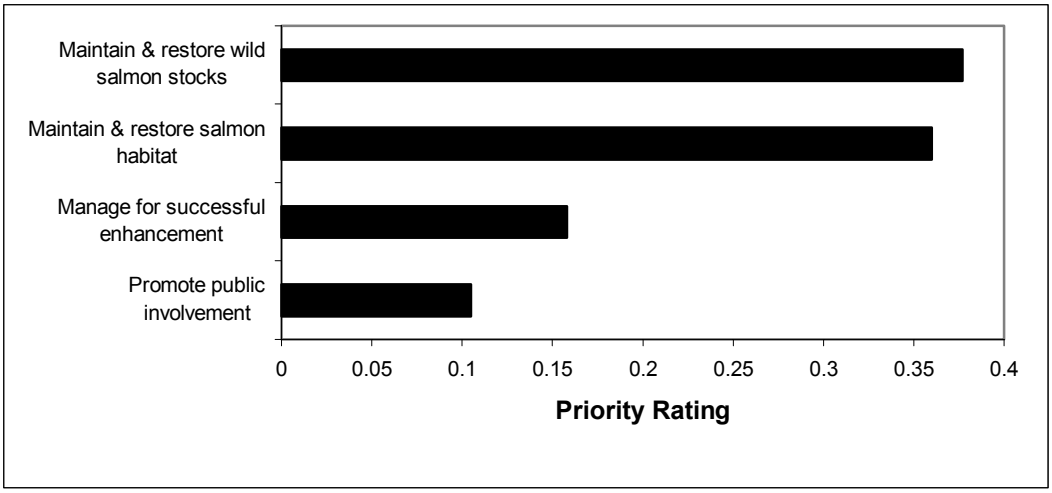
Weights of Importance

Using the AHP model allowed the group to weight goals, objectives and issues in an organized manner (see Figure 1 for relative weights). The four goals were weighted by the entire group as



to their importance to achieving the mission as follows:

Sport and Commercial Fisheries Division staff weighted objectives and issues within the two goals, "Maintain and restore wild salmon stocks" and "Manage for successful enhancement", while Habitat and Restoration Division staff weighted objectives and issues within the goal, "Maintain and restore salmon habitat". All staff worked together to weight objectives and issues within the goal, "Promote public involvement".

The Ratings Model Applied to Projects

Each of 60 projects was rated against criteria described above. The Total Score column in Appendix B shows the ratings given to each project with 1.000 as the highest rating. Seven projects did not meet essential criteria and were dropped from further consideration for funding during the first year (2001), leaving 53 remaining projects for ranking using the AHP. It is important to remember that this criteria rating for each project does not compare projects to each other or provide an overall ranking. The next step provided the ranking of each project compared to the other projects.

Synthesis of the Model and Ranking of Projects

This step explains how the hierarchy of goals, objectives and issues combine to prioritize projects based on judgments of importance to achieving the overall mission. Fifty-three projects

proposed for SSSF funding were ranked by synthesizing the overall model (Figure 2). The highest ranked group is: "Salmon habitat assessment", "Salmon habitat stewardship", and "Salmon habitat surveys". These projects ranked first because their total score in the ratings model were fairly high (see Appendix B), they appeared several times in the model by addressing several issues, the issues they addressed were weighted of high importance, and because few other projects competed with them within a node. The next three highest ranked projects are salmon escapement research projects: "S5 Stikine sockeye escapement", "K3 Chilkat chum and coho escapement estimates" and "S1 Crescent Lake weir". The projects continue to decrease in priority with the lowest ranking for Tongass land management and pink salmon production.

Ranked projects for each of the four goals are found in Figures 3-4. During discussions entailing bargaining and compromise, outlined below, participants focused on results synthesized at the goal level. These projects address similar objectives and issues. The top two projects ranked at each of the four goal levels are within the top third of all projects synthesized in the overall model, providing assurance that the overall model captured the intent of the participants in ranking their highest priority projects.

OPTIMIZATION

The optimization procedure, at the $4 million constraint level, considered the set of proposed projects that included only those for which a commitment to, or assurance of, long term funding was certain (n=36).

Table 1 displays the priority score from the AHP model synthesis, cost, and fate by project resulting from the optimization procedure. Those projects designated as "1" in the decision variable (DV) column are those projects selected by the optimization program for funding; a "0" designates the project is not to be funded. In seeking to maximize the relative benefits of projects to the mission subject to budget constraints, 20 of the 36 projects were selected, totaling $3,981,300.

BARGAINING AND COMPROMISE

After the optimization was completed and participants received copies of the results discussions continued concerning which projects to move forward with the first year. At this point in time

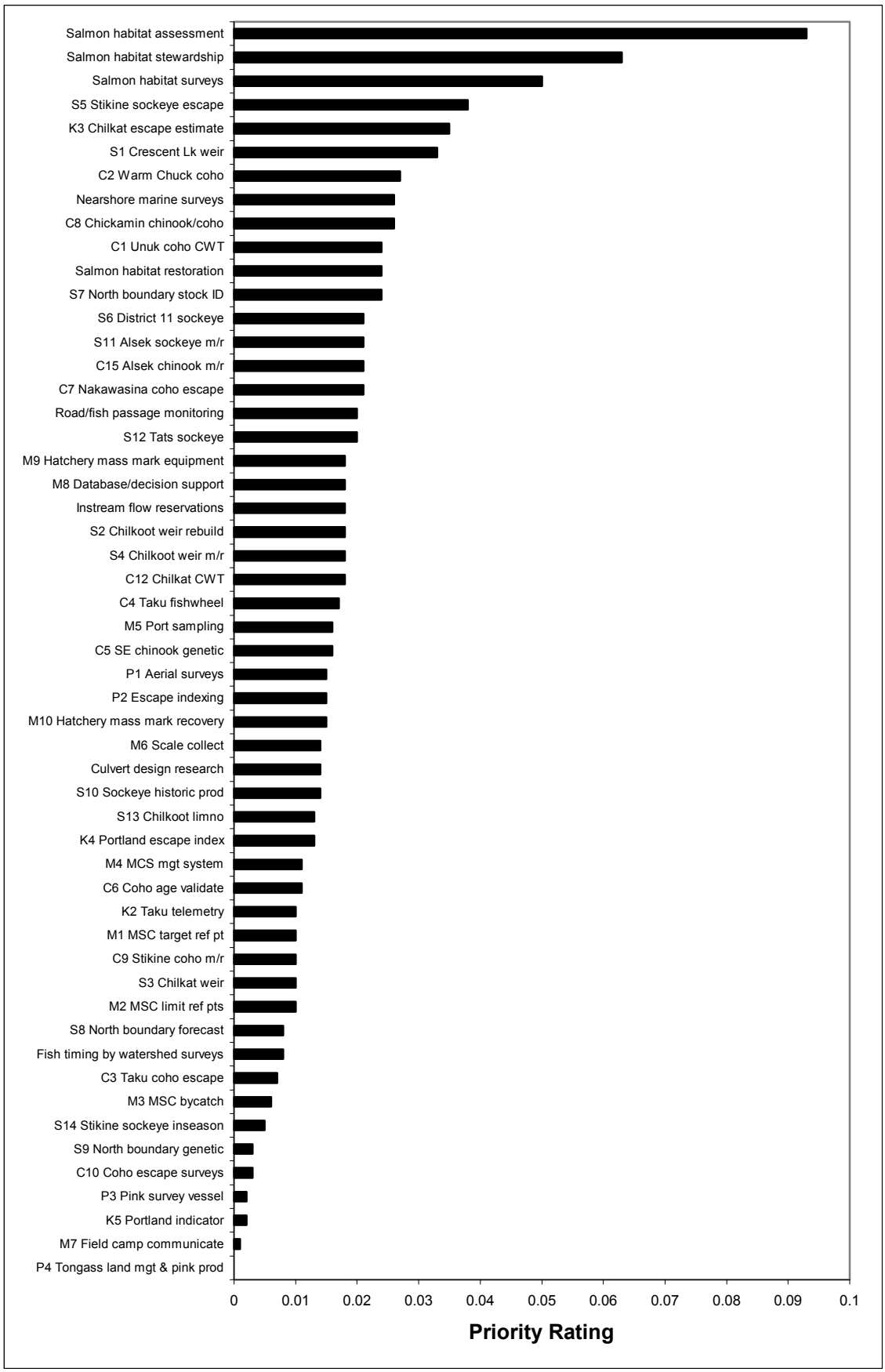


Figure 2.-The priority of SSSF projects from the AHP plan for southeast salmon.

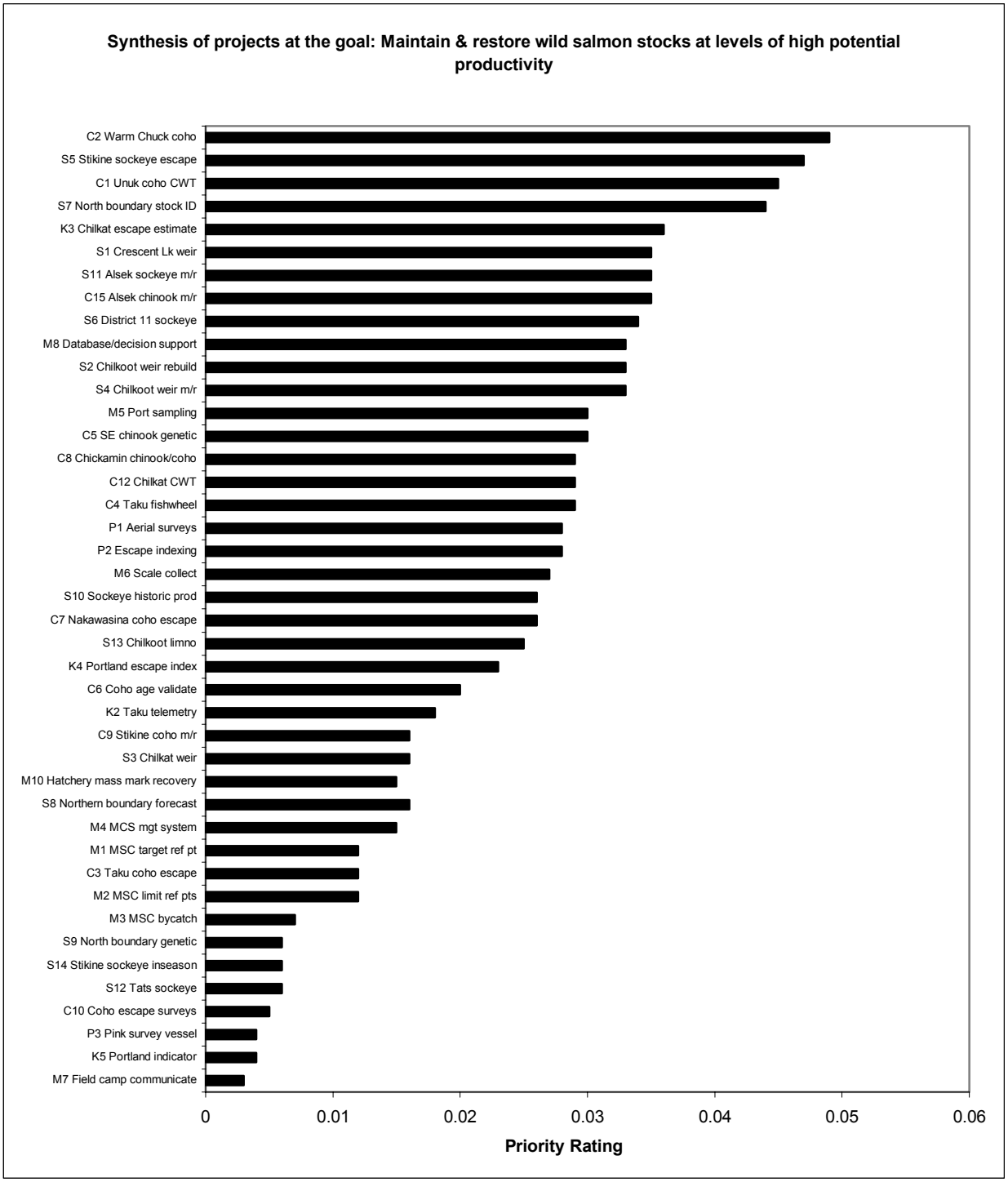


Figure 3.-The priority of SSSF projects synthesized at the goal, "Maintain and restore wild salmon stocks at levels of high potential productivity".

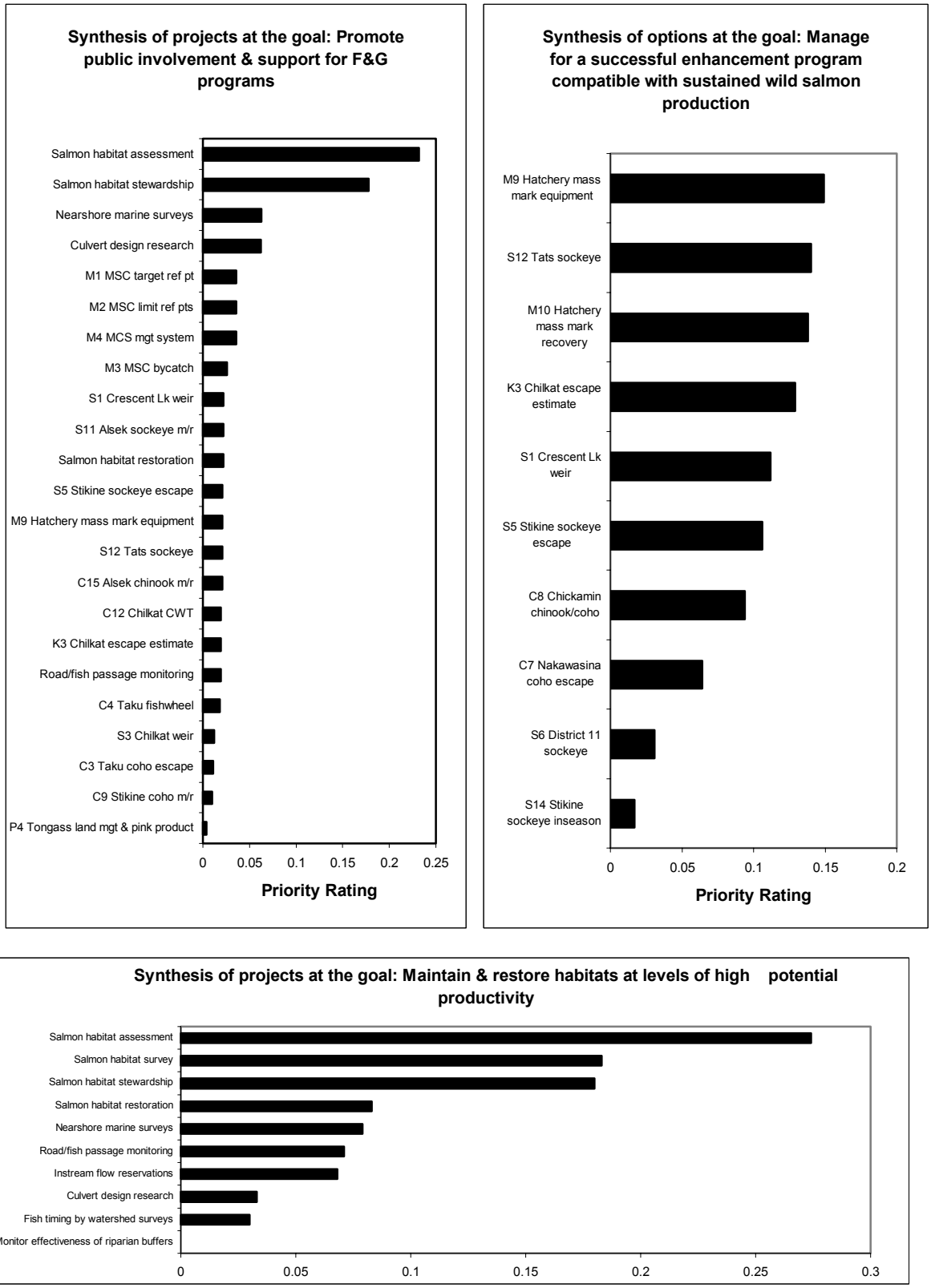


Figure 4.-The priority of SSSF projects synthesized at the goals to "Maintain and restore salmon habitat at levels of high potential productivity", "Manage for a successful enhancement program compatible with sustained wild salmon production", and "Promote public involvement and support for F&G programs".

Table 1.-Optimization of projects for the SSSF (excluding those projects for which commitment to long term funds is suspect), given $4 million in available funds.

Projects	Priority	Cost ($)	DV	Cost ($)	Performance
Salmon habitat assessment	0.093	1,070.7	1	1,070.7	1.000
Salmon habitat stewardship	0.063	453.4	1	453.4	0.677
Salmon habitat surveys	0.050	1,154.1	0	0	0
S5 Stikine sockeye escape	0.038	200	1	200	0.409
S1 Crescent Lk weir	0.033	120	1	120	0.355
C2 Warm Chuck coho	0.027	340	1	340	0.290
Nearshore marine surveys	0.026	126.3	1	126.3	0.280
C8 Chickamin chinook/coho	0.026	331	1	331	0.280
Salmon habitat restoration	0.024	500	0	0	0
S7 North boundary stock ID	0.024	720	0	0	0
C1 Unuk coho CWT	0.024	221	1	221	0.258
S11 Alsek sockeye m/r	0.021	150	1	150	0.226
C7 Nakawasina coho escape	0.021	100	1	100	0.226
C15 Alsek chinook m/r	0.021	315	0	0	0
Road/fish pass monitoring	0.020	997.5	0	0	0
S12 Tats sockeye	0.02	140.4	1	140.4	0.215
S2 Chilkoot weir rebuild	0.018	30	1	30	0.194
M9 Hatchery mass mark equipment	0.018	360	0	0	0
M8 Database/decision support	0.018	240	0	0	0
Instream flow reservations	0.018	120	1	120	0.194
C4 Taku fishwheel	0.017	55	1	55	0.183
C5 SE chinook genetic	0.016	436.8	0	0	0
M6 Scale collect	0.014	320	0	0	0
Culvert design research	0.014	78	1	78	0.151
S13 Chilkoot limno	0.013	170	1	170	0.140
M4 MCS mgt system	0.011	50	1	50	0.118
C6 Coho age validate	0.011	50	1	50	0.118
S3 Chilkat weir	0.010	120	0	0	0
M2 MSC limit ref pts	0.010	100	1	100	0.108
M1 MSC target ref pt	0.010	300	0	0	0
K2 Taku telemetry	0.010	210	0	0	0
S8 North boundary forecast	0.008	160	0	0	0
Fish timing by watershed surveys	0.008	385	0	0	0
C3 Taku coho escape	0.007	75.5	1	75.5	0.075
M3 MSC bycatch	0.006	150	0	0	0
S9 North boundary genetic	0.003	560	0	0	0
Total Cost		10,909.7		3,981.3	5.495
Available Funds				4,000	
Performance/Cost				724.581	

all participants and the Stakeholder Advisory Panel members were confident that additional funding would be appropriated by Congress for this program.

Several of the projects identified as a high priority were multi-year projects (three to five years). After much discussion participants decided to reduce the number of years of funding for specific projects in order to start a greater number of projects as soon as possible. Specifically, each division looked at the projects that were in the optimization and decided whether to reduce the number of years of funding for specific projects. In so doing some project costs were greatly reduced and divisions were able to bring on line additional projects at an earlier date.

THE FINAL PROJECT SET SELECTED FOR THE SSSF IN 2001

The ADF&G selected a total of 29 projects for SSSF funding during 2001, totaling $6,370,000 (Table 2). The selection process was based on the plan and resulting AHP model, the optimization procedure at the $4 million level, Stakeholder Advisory Panel recommendations, and other public input. Another factor that played into the final selection process was the likelihood of additional allocations for continued project funding from other sources (such as by Congress). Accordingly, some projects were significantly reduced in cost by decreasing their life span (i.e., from four to two years) on the assumption of outside funding becoming available in the long term, thereby making them more attractive for short term funding by the SSSF.

The ADF&G's election to use the results of the optimization at the $4 million level recognized the need to have additional funding available for projects thought to be a high priority of the SSSF Stakeholder Advisory Panel. When the panel met to review the results from the optimization (Table 1), they selected five projects for funding that had received a "0" (a decision by the procedure not to fund, based on the priority score/project cost combination). These five projects pertained particularly to implementation of the Pacific Salmon Treaty (Table 2). In part, selection of these five projects was supported by revisions in their cost estimates, which were decreased to nearly half of the original estimates by funding them for two years initially instead of four.

Of the 20 projects selected for funding by the optimization procedure in Table 1, decision-makers within ADF&G elected to fund 15 of those. Two projects that received a "0" in the optimization procedure, "Salmon habitat surveys" and "Road/fish passage monitoring" were funded due to significant reductions in project cost estimates for other Habitat and Restoration Division projects. Finally, seven projects outside of the initial 60 considered by ADF&G in AHP ranking and optimization procedures were chosen based on additional public input.

Table 2.–The final project set selected for the SSSF in 2001.

No.	Project	Revised Cost Estimate (in thousands $)
1[a]	Northern boundary stock ID	370
2[a]	Alsek Chinook mark recapture	164
3[a]	SE Chinook genetic study	287
4[a]	Northern boundary forecast (pre- and in-season)	82
5[a]	Northern boundary genetic study	370
6[b]	Salmon habitat assessment	1,150
7[b]	Salmon habitat stewardship	129
8[b]	Nearshore marine surveys	130
9[b]	Instream flow reservations	164
10[b]	S5 Stikine sockeye escapement	103
11[b]	C2 Warm Chuck coho	154
12[b]	C8 Chickamin Chinook/coho	154
13[b]	C1 Unuk coho coded wire tag	227
14[b]	S11 Alsek sockeye mark recapture	61
15[b]	C7 Nakawasina coho escapement	103
16[b]	S12 Tatsimini sockeye study	144
17[b]	C4 Taku fishwheel	64
18[b]	S13 Chilkoot limnological study	175
19[b]	C6 coho age validation	51
20[b]	C3 Taku coho escapement	75
21[c]	Salmon habitat surveys	302
22[c]	Road/fish passage monitoring	76
23[d]	Invasive species	70
24[d]	Chinook model development	1,000
25[d]	Marine habitat identification	50
26[d]	Fish tissue sampling for pollutants	200
27[d]	Tuya Lake study with Canada	30
28[d]	Stakeholder and technical assistance	300
29[d]	Salmon publication and teacher guide	185
	Total	**6,370**

[a] Selections by the Stakeholder Advisory Panel.

[b] Projects receiving a "1" (to fund) in the optimization procedure.

[c] Projects receiving a "0" (to not fund) in the optimization procedure, but underwent significant reductions in cost estimates.

[d] Selections made from other public input.

CONCLUSION

The major achievements from this planning process were the development of a sustainable salmon plan for southeast Alaska, and the identification of highest priority projects to be implemented with the first year of SSSF funding.

Three approaches were used during different phases of the process to develop the plan and recommend specific projects: (1) AHP, (2) optimization, and (3) bargaining and compromise. The benefits of the three approaches used in the planning process for sustainable salmon in southeast Alaska are discussed below.

(1) The AHP was the first approach used to develop the plan because it has several attributes that are useful when starting a planning process:

- establishes a framework for developing and weighting goals, defining issues, and identifying options that is easily understood and communicated to others;
- incorporates informed judgments;
- facilitates simultaneous consideration of multiple criteria;
- promotes discussion that fosters understanding of varying viewpoints;
- provides the ability to review the reasoning behind a decision; and,
- prioritizes projects.

(2) Optimization was the second approach used. The goal of optimization is to maximize the relative benefits of proposed projects (that is, the priority scores of projects derived using AHP) subject to specific budget constraints. The optimization procedure examined many possible combinations of funding levels to maximize the total relative benefits. By examining these combinations, a rationale approach to project selection was employed. The majority of projects were selected using this approach.

(3) Bargaining and compromise was an integral part of determining which projects to pursue. This approach took into consideration existing expectations that people had for the funds and brought in public opinion on the best use of funds. For example, the Stakeholder Advisory Panel considered obligations towards implementation of the Pacific Salmon Treaty among the most important projects.

SUGGESTIONS FOR FUTURE PLANNING

(1) Developing a more complete and accurate plan.

Completeness and accuracy of a plan is influenced by the length of time that is allotted to planning as well as expertise and opinions of participants. The commitment necessary for a meaningful length of time for group participation may be difficult to obtain – this is an obstacle to successful decision-making. Four days is the length of time generally recommended for the initial meeting of groups intent on planning, and successive meetings of a shorter duration can be scheduled for review and editing. For the southeast sustainable salmon planning effort, 2.5 days were allocated to the initial group meeting. It is possible that had the group had more time to engage in discussions additional details, such as rearing areas for salmon, would have surfaced. Or, the group might have requested additional details from outside experts. Few issues and options generated for a significant objective in the AHP hierarchy may indicate that additional discussion at that node is warranted. Techniques to decide which experts or constituencies to take into account in fisheries planning are referenced below.

(2) Incorporating the public and other agencies into the planning process.

It is generally agreed that participation of stakeholders in selected applications of decision-making can lead to improved fisheries management (Lane 1989). Stakeholder input on issues of concern and support of the planning process is important to the long-term success of a strategic approach to sustainable salmon. In the planning approach used for sustainable salmon in southeast Alaska expert judgment was crucial to comparisons of relative importance. "A strong aspect of the AHP is that the experienced decision-makers who specify the hierarchy also supply judgments on the relative importance of the elements" (Saaty 1999, pg 69). Expert judgment is defined as "previous relevant experience, supported by rational thought and knowledge" (Saaty and Kearns 1985). Technical experts, such as biologists and managers, are central to describing a fisheries problem and proposing a solution. However, non-technical experts such as in industry, conservation groups, or the general angling public, can provide key insights to issues comprising the problem and possible options based on their previous relevant experience and knowledge of the situation. A significant aspect of planning is to decide which members of the public should participate and how should their opinions be incorporated into the planning process? There are several techniques to decide which constituencies to take into account in fisheries planning

(Hilborn and Walters 1977, Keeney 1977, Healey 1984, Merritt and Criddle 1993). Methods for incorporating public opinion vary; three prominent methods are:

Public review - Agency staff develop a plan, distribute the plan for review soliciting comments over a given period of time, take comments into consideration and revise the plan as warranted.

Public, industry and scientific panels – The agency establishes panels whose members are brought into the planning process at the request of the agency during specified steps throughout the process and are the panels kept informed of progress.

Full participation – The agency invites selected stakeholders to participate in the full planning process, and is prepared to implement the outcome. Difficulty with this method arises when aspects of the suggested solution are outside of the agency's jurisdiction or questions arise as to the feasibility or legality of the solution.

For the southeast sustainable salmon plan, public opinion was incorporated through a review of the recommended projects by the Stakeholder Advisory Panel of the SSSF.

(3) Incorporating new information into the planning process.

Qualitative preference and quantitative information can change over the course of planning, perhaps requiring new assessment. This occurred during the southeast sustainable salmon planning process. New information about additional funding dramatically altered initial SSSF project cost estimates as costs for multi-year projects were spread out over two funding allocation cycles. While the optimization could have been updated with new cost projections, decision-makers elected to use the bargaining and compromise planning approach in reassessing project selection.

The AHP and optimization are easily updated with new information or altered preferences through software programs, although reassessment using the AHP would likely require some form of group interaction (e.g., teleconference, internet, or meeting).

(4) Addressing competitiveness for limited funding in the planning process.

Several factors can contribute to making group decisions and problem-solving difficult. One of these factors is competitiveness – specifically, competition for limited funds for projects. Plan participants bring various areas of expertise, experience and to some degree advocacy for their

user groups. Most participants are concerned about information needs and issues in their programs that the limited funds could address. This bias may lead participants to promote their individual top priority projects rather than collaborating to attain the group's goal.

While differences of opinion are expected and helpful in problem-solving, effectiveness at problem-solving is compromised by a "win-lose" attitude (Coughlan and Armour 1992). In our workshop and subsequent meetings to develop the framework and select projects, participants were encouraged to listen and value the opinions of others. In this context, participants from each of the divisions learned about the concerns regarding habitat and fish management of other divisions. Once the goals and objectives were established and weights applied, participants were divided into smaller groups of similar concern and then brought back together to discuss their priorities with the larger group. By having groups of similar concern develop and weight elements of the problem, some of the competitiveness for funds was alleviated.

ACKNOWLEDGMENTS

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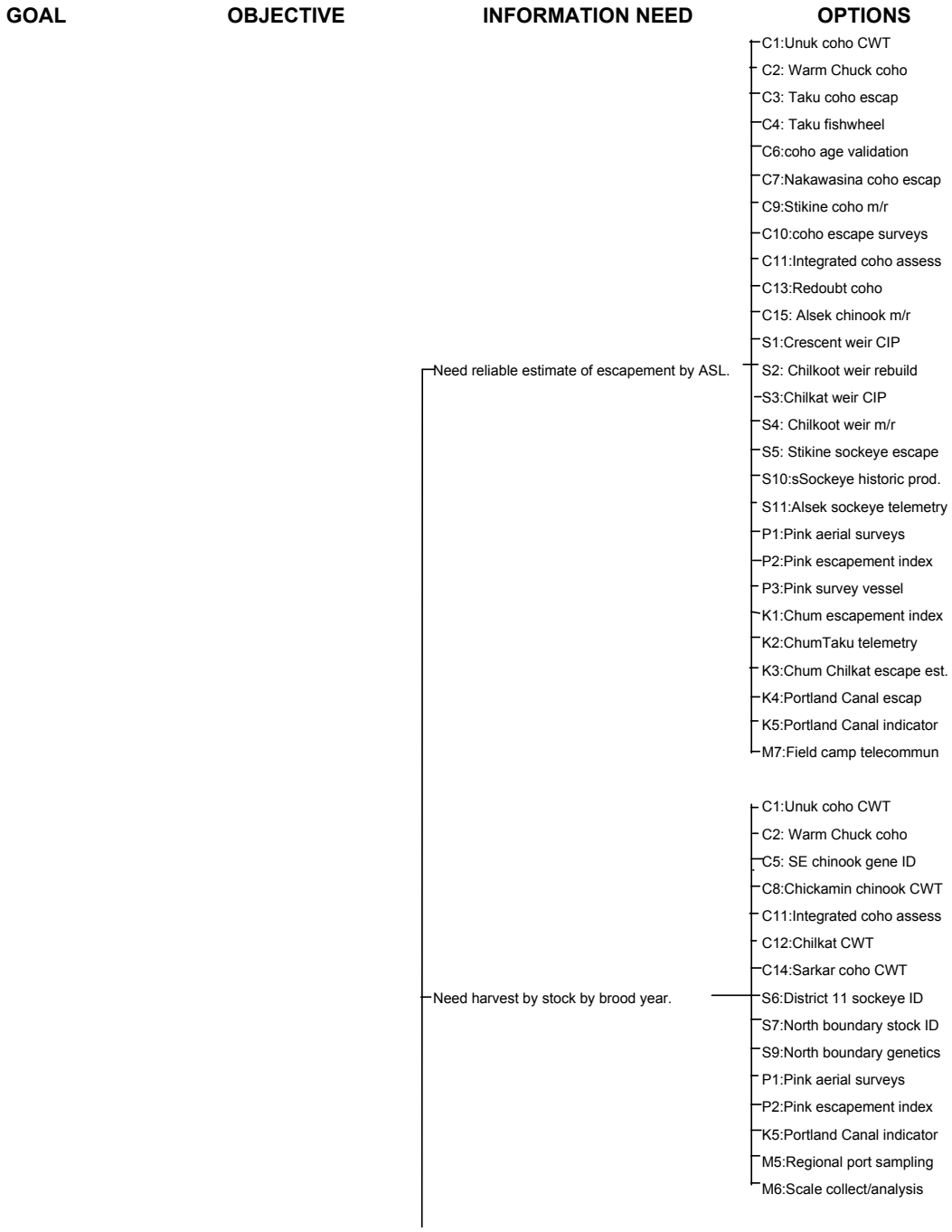
APPENDIX A

Appendix A.-The plan for salmon research, monitoring, restoration and stewardship in southeast Alaska including the proposed projects for the Southeast Sustainable Salmon Fund, 2001.



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Appendix A.-Page 2 of 9.

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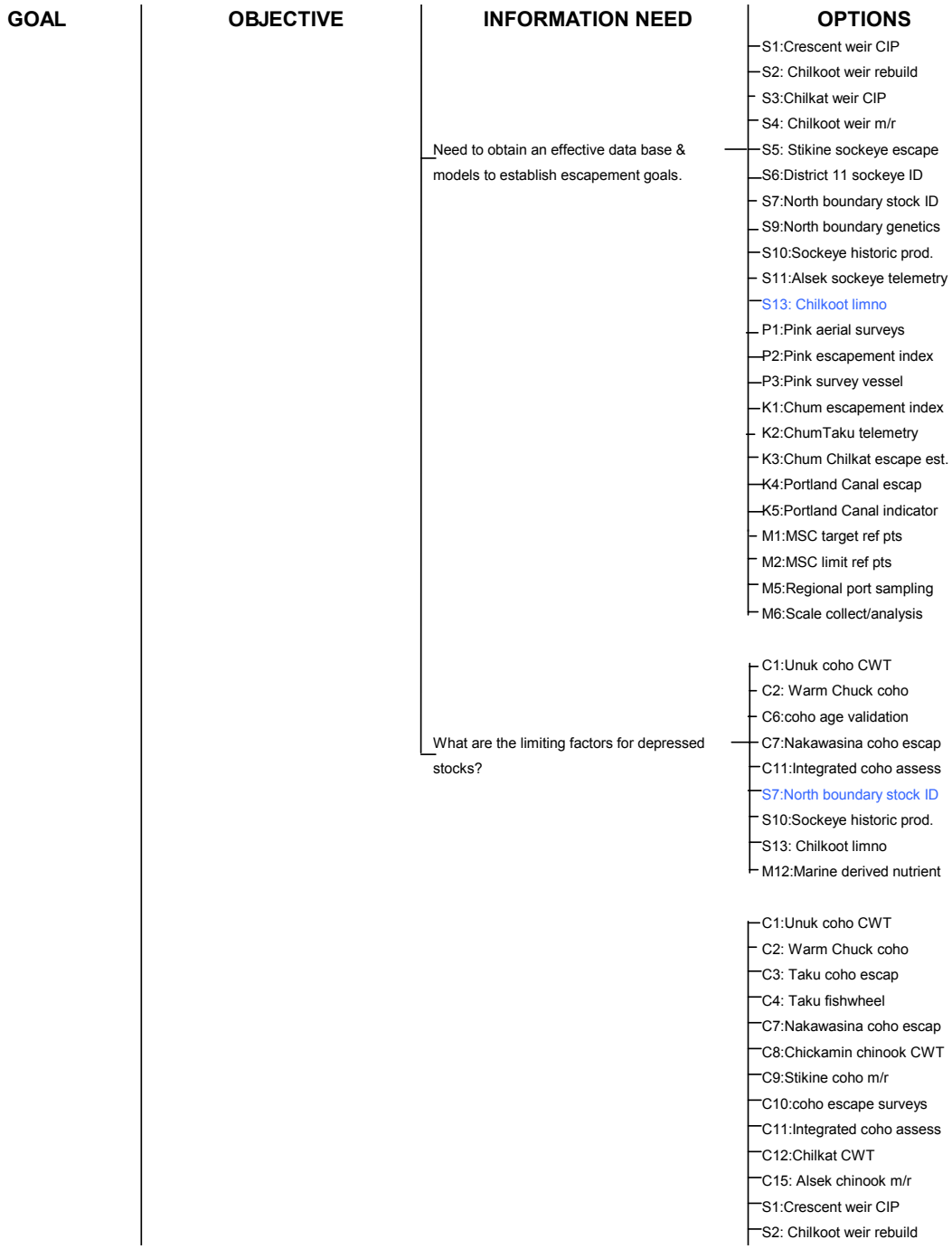
Appendix A.-Page 3 of 9.



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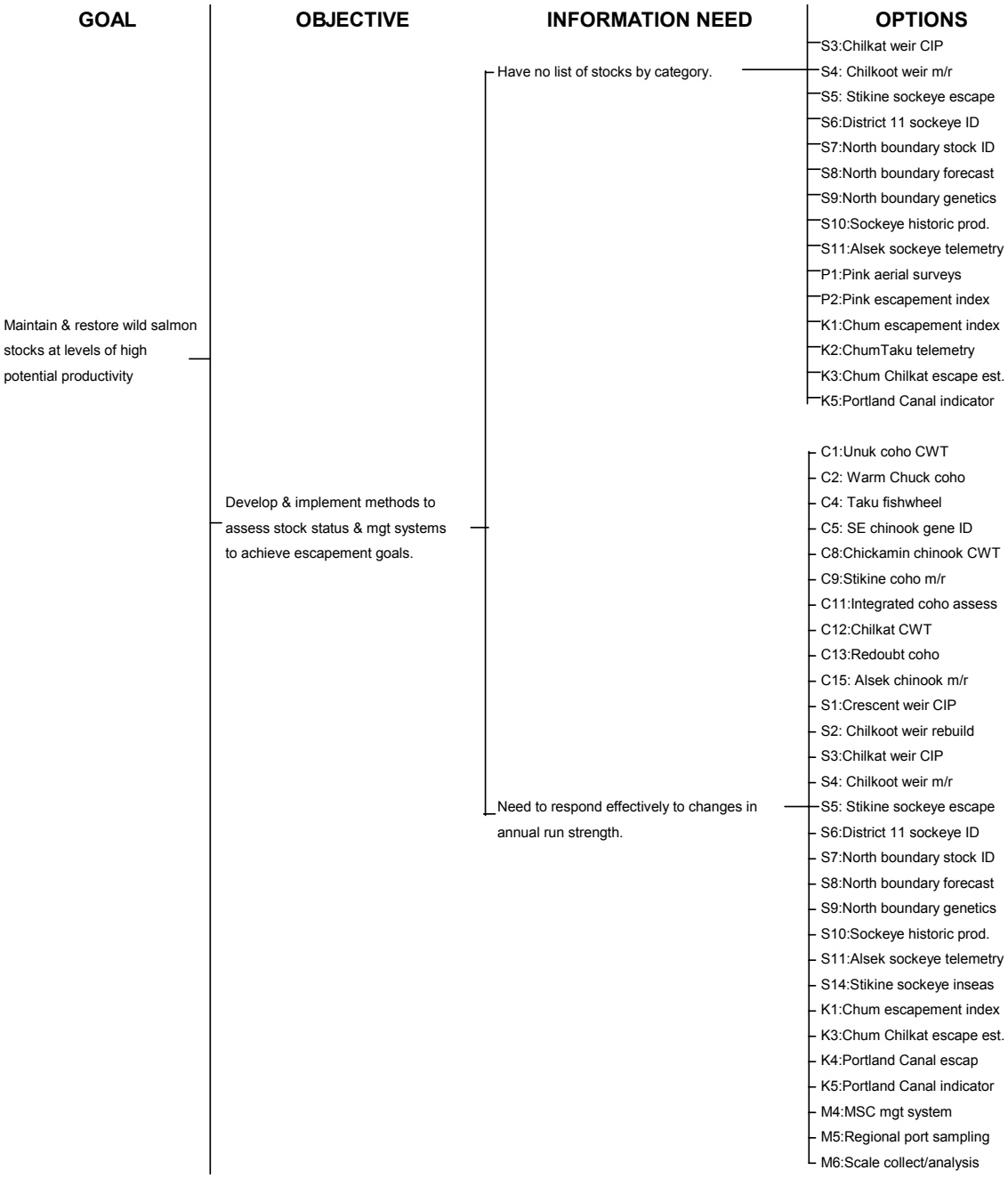
Appendix A.-Page 4 of 9.



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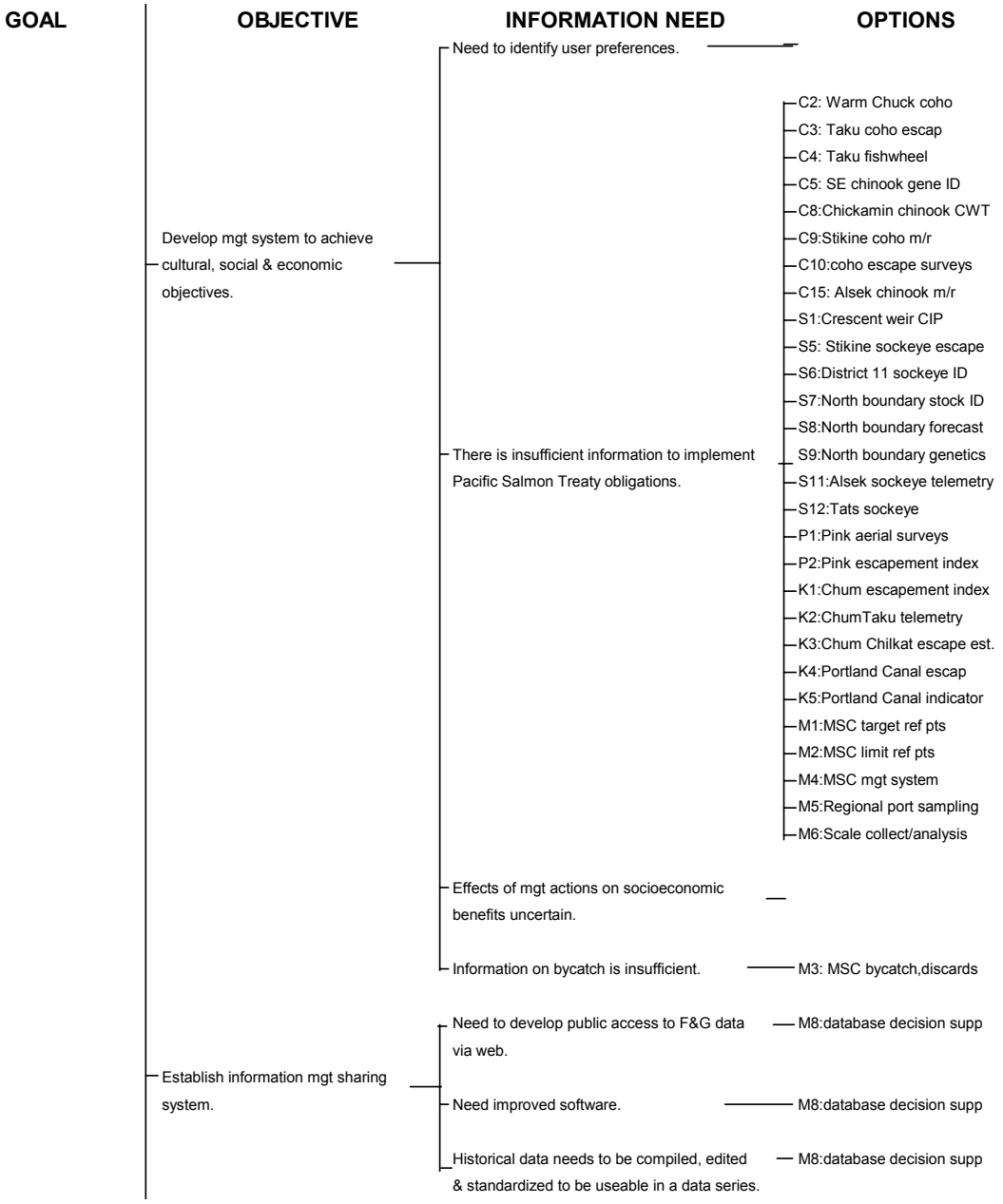
GOAL
OBJECTIVE
INFORMATION NEED
OPTIONS
Develop mgt system to achieve cultural, social & economic objectives.
Need to identify user preferences.
There is insufficient information to implement Pacific Salmon Treaty obligations.
C2: Warm Chuck coho
C3: Taku coho escap
C4: Taku fishwheel
C5: SE chinook gene ID
C8:Chickamin chinook CWT
C9:Stikine coho m/r
C10:coho escape surveys
C15: Alsek chinook m/r
S1:Crescent weir CIP
S5: Stikine sockeye escape
S6:District 11 sockeye ID
S7:North boundary stock ID
S8:North boundary forecast
S9:North boundary genetics
S11:Alsek sockeye telemetry
S12:Tats sockeye
P1:Pink aerial surveys
P2:Pink escapement index
K1:Chum escapement index
K2:ChumTaku telemetry
K3:Chum Chilkat escape est.
K4:Portland Canal escap
K5:Portland Canal indicator
M1:MSC target ref pts
M2:MSC limit ref pts
M4:MSC mgt system
M5:Regional port sampling
M6:Scale collect/analysis
Effects of mgt actions on socioeconomic benefits uncertain.
Information on bycatch is insufficient.
M3: MSC bycatch,discards
Establish information mgt sharing system.
Need to develop public access to F&G data via web.
M8:database decision supp
Need improved software.
M8:database decision supp
Historical data needs to be compiled, edited & standardized to be useable in a data series.
M8:database decision supp

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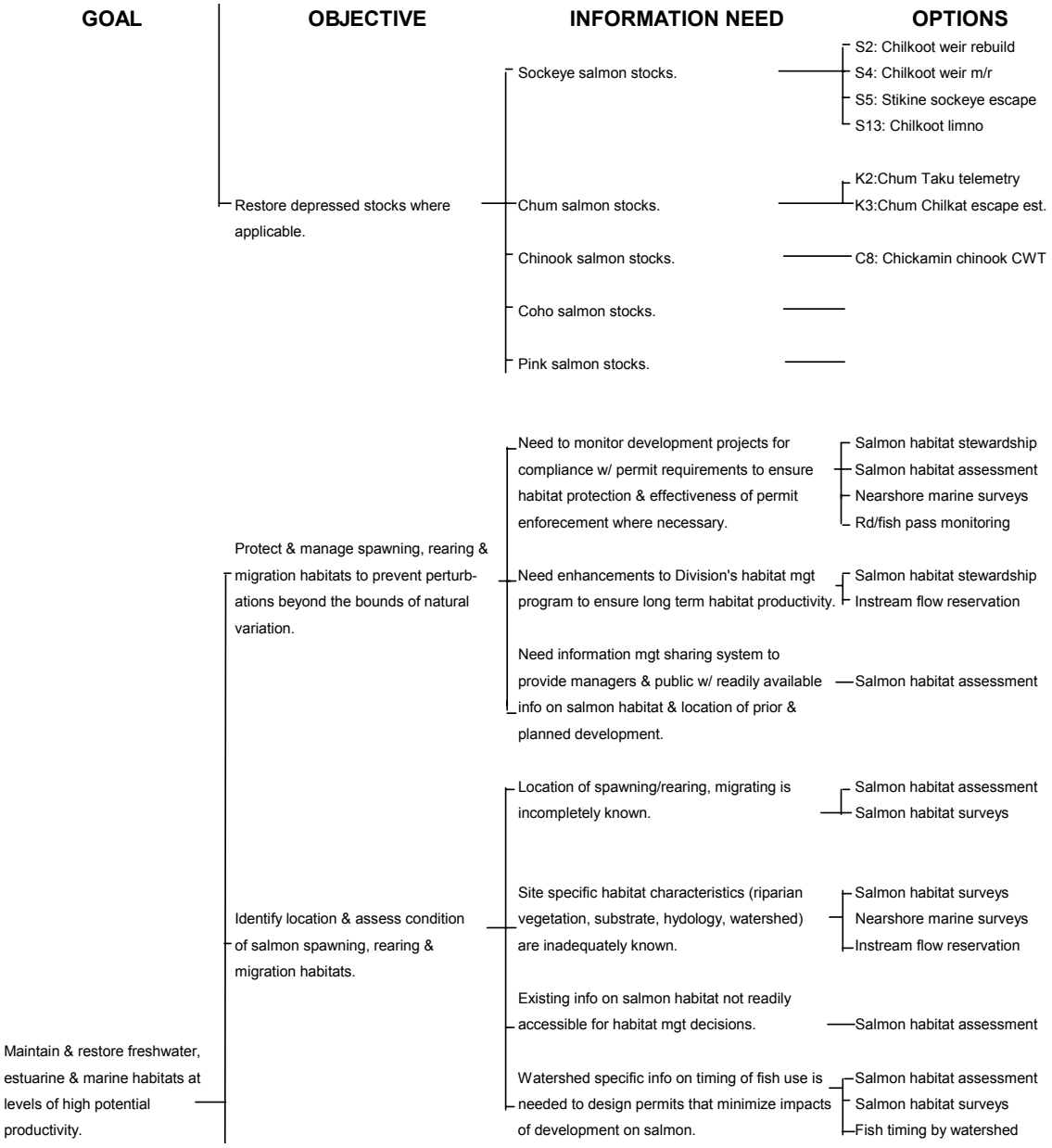
Appendix A.–Page 6 of 9.



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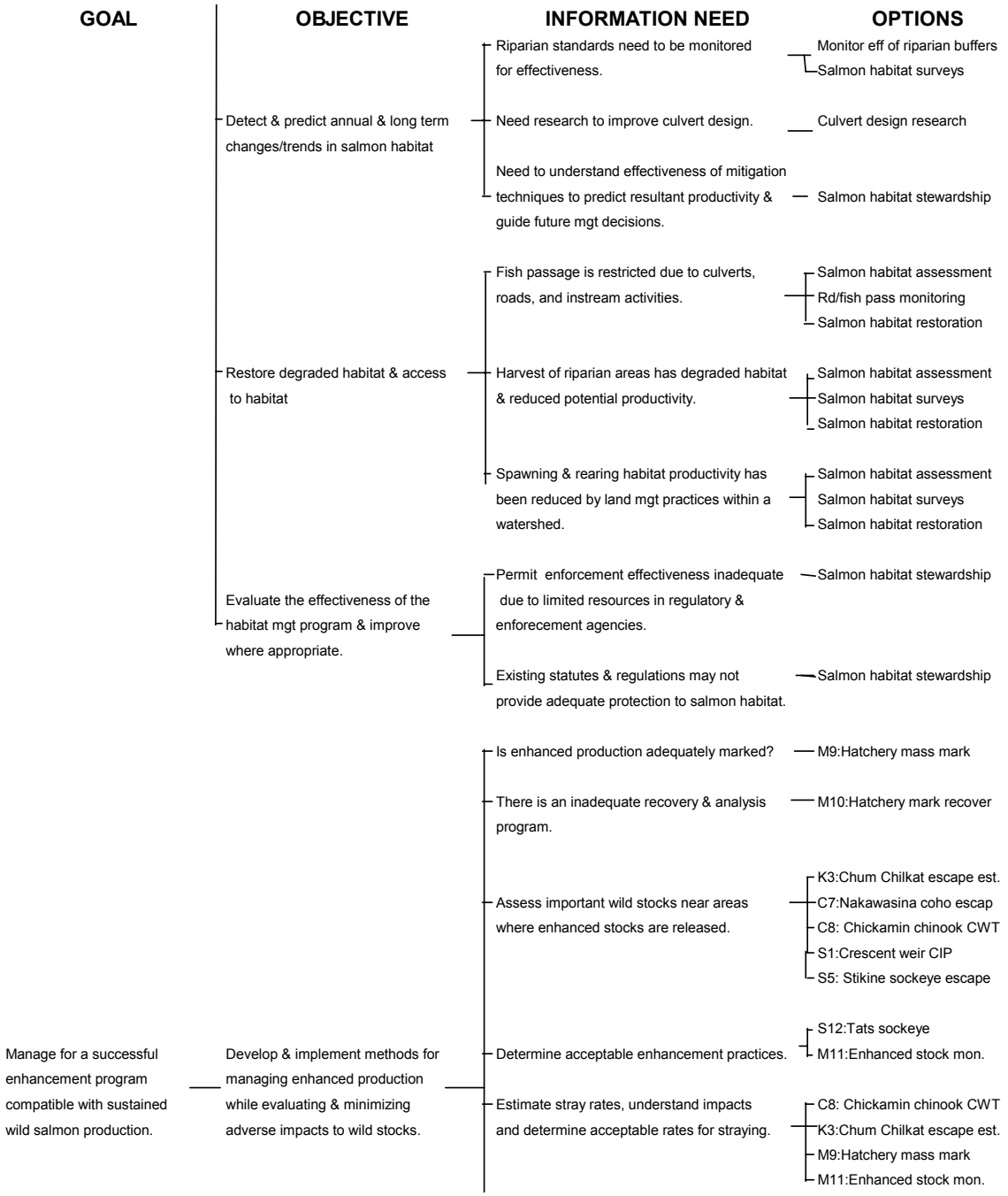
GOAL
OBJECTIVE
INFORMATION NEED
OPTIONS
Riparian standards need to be monitored for effectiveness.
Monitor eff of riparian buffers
Salmon habitat surveys
Detect & predict annual & long term changes/trends in salmon habitat
Need research to improve culvert design.
Culvert design research
Need to understand effectiveness of mitigation techniques to predict resultant productivity & guide future mgt decisions.
Salmon habitat stewardship
Fish passage is restricted due to culverts, roads, and instream activities.
Salmon habitat assessment
Rd/fish pass monitoring
Salmon habitat restoration
Restore degraded habitat & access to habitat
Harvest of riparian areas has degraded habitat & reduced potential productivity.
Salmon habitat assessment
Salmon habitat surveys
Salmon habitat restoration
Spawning & rearing habitat productivity has been reduced by land mgt practices within a watershed.
Salmon habitat assessment
Salmon habitat surveys
Salmon habitat restoration
Permit enforcement effectiveness inadequate due to limited resources in regulatory & enforecement agencies.
Salmon habitat stewardship
Evaluate the effectiveness of the habitat mgt program & improve where appropriate.
Existing statutes & regulations may not provide adequate protection to salmon habitat.
Salmon habitat stewardship
Is enhanced production adequately marked?
M9:Hatchery mass mark
There is an inadequate recovery & analysis program.
M10:Hatchery mark recover
Assess important wild stocks near areas where enhanced stocks are released.
K3:Chum Chilkat escape est.
C7:Nakawasina coho escap
C8: Chickamin chinook CWT
S1:Crescent weir CIP
S5: Stikine sockeye escape
Manage for a successful enhancement program compatible with sustained wild salmon production.
Develop & implement methods for managing enhanced production while evaluating & minimizing adverse impacts to wild stocks.
Determine acceptable enhancement practices.
S12:Tats sockeye
M11:Enhanced stock mon.
Estimate stray rates, understand impacts and determine acceptable rates for straying.
C8: Chickamin chinook CWT
K3:Chum Chilkat escape est.
M9:Hatchery mass mark
M11:Enhanced stock mon.

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GOAL
OBJECTIVE
INFORMATION NEED
OPTIONS
Promote public involvement & support for F&G programs.
Establish effective lines of communications with the stakeholders.
To what extent do enhanced fish compete with and prey on wild salmon?
S12:Tats sockeye
There is an incomplete accounting of returns to terminal harvest areas for some stocks.
M11:Enhanced stock mon.
M10:Hatchery mark recover
Develop mgt tools to effectively harvest enhanced fish.
S1:Crescent weir CIP
S5: Stikine sockeye escape
S6:District 11 sockeye ID
S14:Stikine sockeye inseas
Need sound fish culture practices.
Need to seek stakeholder input on F&G plans.
Salmon habitat assessment
Sponsor & partcipate in technical & user group forums.
Culvert design research
Salmon habitat assessment
Need to offer technical assistance.
Salmon habitat stewardship
Need to achieve increased public acceptance & compliance with regulations & programs (such as tag returns).
M1:MSC target ref pts
M2:MSC limit ref pts
M3: MSC bycatch,discards
M4:MSC mgt system
Salmon habitat assessment
Salmon habitat stewardship
Culvert design research
Nearshore marine survey
Need to publish & distribute F&G reports.
Salmon habitat assessment
Need to encourage cooperative projects with others.
C3: Taku coho escap
C4: Taku fishwheel
C9:Stikine coho m/r
C11:Integrated coho assess
C12:Chilkat CWT
C13:Redoubt coho
C15: Alsek chinook m/r
S1:Crescent weir CIP
S3:Chilkat weir CIP
S5: Stikine sockeye escape
S11:Alsek sockeye telemetry
S12:Tats sockeye

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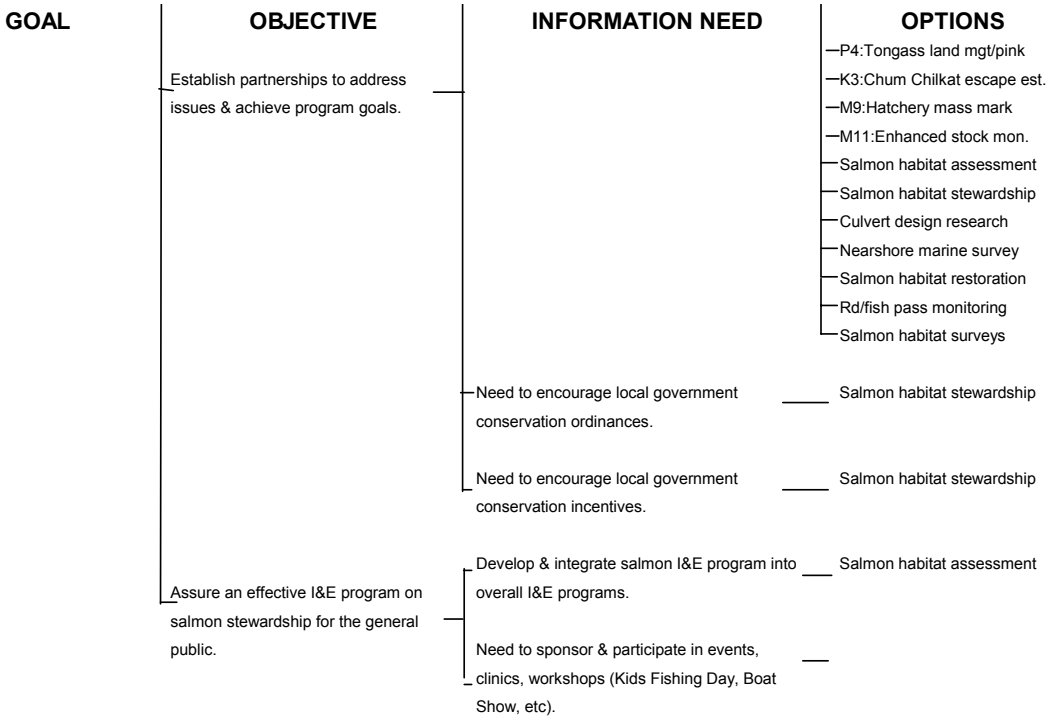
GOAL
OBJECTIVE
INFORMATION NEED
OPTIONS
Establish partnerships to address issues & achieve program goals.
P4:Tongass land mgt/pink
K3:Chum Chilkat escape est.
M9:Hatchery mass mark
M11:Enhanced stock mon.
Salmon habitat assessment
Salmon habitat stewardship
Culvert design research
Nearshore marine survey
Salmon habitat restoration
Rd/fish pass monitoring
Salmon habitat surveys
Need to encourage local government conservation ordinances.
Salmon habitat stewardship
Need to encourage local government conservation incentives.
Salmon habitat stewardship
Assure an effective I&E program on salmon stewardship for the general public.
Develop & integrate salmon I&E program into overall I&E programs.
Salmon habitat assessment
Need to sponsor & participate in events, clinics, workshops (Kids Fishing Day, Boat Show, etc).

APPENDIX B

Appendix B.–Ratings table of 60 proposed projects for the SSSF.

No.	Criteria	Total Score	Applicable to SSSF?	Funding[a] Available for Long Term Projects?	Likelihood of Success	Stakeholder Support	Project Contributes Significantly to Salmon Conservation	Project Fills a Gap in the Overall Program	Coop. Funded Projects (100% is all F&G)
	The Criterion's Weight		zero	zero	.241	.141	.235	.219	.163
	Projects								
1	S11-Alsek sockeye tele & m/r	1.000	YES	YES	HIGH	YES	HIGH	A LOT	25%
2	S1-Crescent Lk weir CIP	1.000	YES	N/A	HIGH	YES	HIGH	A LOT	25%
3	C15-Alsek chinook m/r radiotag	0.946	YES	YES	HIGH	YES	HIGH	A LOT	50%
4	S5-Stikine sockeye escapement	0.946	YES	YES	HIGH	YES	HIGH	A LOT	50%
5	Nearshore marine surveys	0.946	YES	N/A	HIGH	YES	HIGH	A LOT	50%
6	S12-Tats sockeye research	0.946	YES	YES	HIGH	YES	HIGH	A LOT	50%
7	Salmon habitat restoration	0.946	YES	N/A	HIGH	YES	HIGH	A LOT	50%
8	M9-hatchery mass marking equip	0.946	YES	N/A	HIGH	YES	HIGH	A LOT	50%
9	Salmon habitat assessment	0.891	YES	N/A	HIGH	YES	HIGH	A LOT	75%
10	Salmon habitat surveys	0.891	YES	N/A	HIGH	YES	HIGH	A LOT	75%
11	Fishing timing by watershed	0.855	YES	N/A	HIGH	YES	HIGH	A LOT	100%
12	S6-District 11 sockeye stock ID	0.855	YES	?	HIGH	YES	HIGH	A LOT	100%
13	S7-North boundary stock ID	0.855	YES	YES	HIGH	YES	HIGH	A LOT	100%
14	M10-hatchery mass mark/recov	0.855	YES	?	HIGH	YES	HIGH	A LOT	100%
15	M2-MSC compliance limit ref pts	0.855	YES	N/A	HIGH	YES	HIGH	A LOT	100%
16	P1-pink aerial surveys	0.855	YES	?	HIGH	YES	HIGH	A LOT	100%
17	P2-pink escapement indexing	0.855	YES	?	HIGH	YES	HIGH	A LOT	100%
18	C7-Nakawasina coho escapement	0.855	YES	YES	HIGH	YES	HIGH	A LOT	100%

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Appendix B.–Page 2 of 4.

No.	Criteria	Total Score	Applicable to SSSF?	Funding[a] Available for Long Term Projects?	Likelihood of Success	Stakeholder Support	Project Contributes Significantly to Salmon Conservation	Project Fills a Gap in the Overall Program	Coop. Funded Projects (100% is all F&G)
	The Criterion's Weight		zero	zero	.241	.141	.235	.219	.163
	Projects								
19	C2-Warm chuck coho	0.855	YES	YES	HIGH	YES	HIGH	A LOT	100%
20	C1-Unuk coho CWT & escap	0.855	YES	YES	HIGH	YES	HIGH	A LOT	100%
21	K3-Chilkat chum & coho escape	0.855	YES	?	HIGH	YES	HIGH	A LOT	100%
22	K4-Portland canal escape index	0.855	YES	?	HIGH	YES	HIGH	A LOT	100%
23	M4-MSC compliance mgt sys	0.855	YES	N/A	HIGH	YES	HIGH	A LOT	100%
24	C12-Chilkat CWT	0.855	YES	?	HIGH	YES	HIGH	A LOT	100%
25	C5-SE chinook genetic stock ID	0.855	YES	YES	HIGH	YES	HIGH	A LOT	100%
26	S13-Chilkoot limnology	0.855	YES	N/A	HIGH	YES	HIGH	A LOT	100%
27	S4-Chilkoot weir m/r	0.855	YES	?	HIGH	YES	HIGH	A LOT	100%
28	S2-Chilkoot weir rebuild	0.855	YES	N/A	HIGH	YES	HIGH	A LOT	100%
29	M1-MSC compliance target ref pt	0.855	YES	N/A	HIGH	YES	HIGH	A LOT	100%
30	M5-regional port sampling	0.855	YES	?	HIGH	YES	HIGH	A LOT	100%
31	M6-scale collection & analysis	0.855	YES	N/A	HIGH	YES	HIGH	A LOT	100%
32	Road/fish pass monitor	0.855	YES	N/A	HIGH	YES	HIGH	A LOT	100%
33	Salmon habitat stewardship	0.855	YES	N/A	HIGH	YES	HIGH	A LOT	100%
34	C4-Taku fishwheel construction	0.803	YES	N/A	HIGH	NOTMUCH	HIGH	A LOT	75%
35	Instream flow reservations	0.766	YES	N/A	HIGH	NOTMUCH	HIGH	A LOT	100%
36	C6-coho age validation	0.766	YES	N/A	HIGH	NOTMUCH	HIGH	A LOT	100%

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Appendix B.–Page 3 of 4.

No.	Criteria	Total Score	Applicable to SSSF?	Funding[a] Available for Long Term Projects?	Likelihood of Success	Stakeholder Support	Project Contributes Significantly to Salmon Conservation	Project Fills a Gap in the Overall Program	Coop. Funded Projects (100% is all F&G)
	The Criterion's Weight		zero	zero	.241	.141	.235	.219	.163
	Projects								
37	S8-North boundary area forecast	0.675	YES	YES	HIGH	YES	HIGH	NOTMUCH	75%
38	M3-MSC compliance bycatch	0.622	YES	N/A	HIGH	YES	LOW	A LOT	100%
39	C8-Chickamin king,coho CWT	0.622	YES	YES	HIGH	YES	LOW	A LOT	100%
40	S10-sockeye historic produc	0.606	YES	?	MOD	NOTMUCH	HIGH	A LOT	100%
41	K2-Taku radio telemetry	0.550	YES	N/A	HIGH	NOTMUCH	HIGH	NOTMUCH	100%
42	Culvert design research	0.550	YES	N/A	HIGH	NOTMUCH	HIGH	NOTMUCH	100%
43	M7-field camp telecommunic	0.534	YES	?	HIGH	NOTMUCH	LOW	A LOT	100%
44	S3-Chillkat weir CIP	0.534	YES	N/A	HIGH	NOTMUCH	LOW	A LOT	100%
45	M8-database/decision support	0.534	YES	N/A	HIGH	NOTMUCH	LOW	A LOT	100%
46	C3-Taku coho escape varify	0.498	YES	N/A	MOD	YES	LOW	A LOT	75%
47	S14-Stikine sockeye inseason run	0.478	YES	?	MOD	YES	HIGH	NOTMUCH	100%
48	C9-Stikine coho m/r estimate	0.464	YES	?	MOD	NOTMUCH	LOW	A LOT	50%
49	P3-escapement survey vessel	0.317	YES	?	HIGH	NOTMUCH	LOW	NOTMUCH	100%
50	C10-coho escapement surveys	0.317	YES	?	HIGH	NOTMUCH	LOW	NOTMUCH	100%
51	P4-Tongass mgt & pink product	0.157	YES	?	MOD	NOTMUCH	LOW	NOTMUCH	100%
52	S9-North boundary genetic ID	0.157	YES	YES	MOD	NOTMUCH	LOW	NOTMUCH	100%
53	K5-Portland canal indicator stock	0.085	YES	?	LOW	NOTMUCH	LOW	NOTMUCH	100%

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No.	Criteria	Total Score	Applicable to SSSF?	Funding[a] Available for Long Term Projects?	Likelihood of Success	Stakeholder Support	Project Contributes Significantly to Salmon Conservation	Project Fills a Gap in the Overall Program	Coop. Funded Projects (100% is all F&G)
	The Criterion's Weight		zero	zero	.241	.141	.235	.219	.163
	Projects								
54	C13-Redoubt Lk coho escape	0	YES	NO					
55	C14-Sarkar coho CWT	0	YES	NO					
56	M12-marine derived nutrients	0	YES	NO					
57	M11-enhanced stock monitoring	0	YES	NO					
58	C11-integrated coho assess/monit	0	YES	NO					
59	K1-escapement indexing	0	YES	NO					
60	Monitor effective riparian buffers	0	YES	NO					

[a] "N/A" means staff did not believe that the question regarding long term funding for long term projects pertained to a particular project. A question mark indicated that staff believed long term funding was uncertain or suspect. Those 53 projects denoted by "N/A", "YES" and "?" were included in the AHP model synthesis. Only those 36 projects denoted by "N/A" or "YES" were included in the optimization procedure.